

# AMATEUR SATELLITE REPORT

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## Mode L Activity Level Rises

ASR has recently received several encouraging reports about Mode L activity around the world. Notes have been received from W4FJ, K0RZ, JR1SWB and JA1SYK. Thanks to them for the following items.

- December 19, 1983 Mode-L Activity: Report Number 4 by K0RZ:

My AO-10 Mode-L station is as follows: The 436 antenna is a NBS Tech Note 688, 8x15 element Yagi array (measured gain is 22+ dBd) with a GaAsFET preamp at the antennas. On 1269 I am using a 2x38 element loop Yagi array (measured gain is 22+ dBd) with about 120 watts of rf. This with feed line losses should give me about 20 kW EIRP. All antennas are horizontally polarized.

With this setup, I am capable of receiving my own signal about 18 dB above the noise. I receive the Beacon about 30 dB above the noise. The Beacon shows both intermod and crossmod of signals in the transponder downlink.

Most of the activity is between 436.45 and 436.55. So far I have worked the following stations:

Call	1269 Equip.		
F9FT	150W, 4x23 Yagi	VE7CLD	Unknown
DJ5BV	400W, 16x23 Yagi	W0HHE	100W, 20 ft. Dish
VE7BBG	2.5W, 20 ft. Dish	DL7YC	70W, 3 mtr. Dish
K6MYC	20W, 16 ft. Dish	PA0SSB	2W, Single Yagi
W8YIO	10W, 4.2 ft. Dish	G3WDC	100W, 5 ft. Dish
DJ3OS	5000W ERP	JA3EUP	Unknown
DJ8QL	20W, 16 ft. Dish	OE9XXI	50W, 26 ft. Dish
JR4BRS	5.5W, 3 mtr. Dish	DJ9PC	200W, 3 mtr. Dish
VK5QR	90W, 2 mtr. Dish	OE9FKI	50W, 2.6 mtr. Dish
ZS6AXT	100W, 16E1 Quagi	DL1BU	100W, 2 mtr. Dish
KL7NO	1000W, ERP	DK2LR	60W, 4x10 E1 + Refl.
HB9CAI	50W, 4x23 (F9FT)	GW3XYW	75W, 6 mtr. Dish
OE1VKW	50W, 16T Helix	OE1HAB	7W, 4x23 (F9FT)
JA4TTS	20W, 100E1 Yagi	JA1SYK	30W, 2 mtr. Dish
JA1UHY	10W, 2x24 Yagi		

In addition to these 29 stations listed above, the following stations have been active on Mode-L as reported by DJ9PC, OE9FKI, OE9XXI, and VE7BBG. In total there have been 45 stations reported to have made two way contacts through AO-10 Mode-L.

DC6YU	DL9GU	I5CTE	JA4CDC	JE1HJJ
DJ5KQ	DJ7BG	I7UGO	JA4GVA	JA6DZO
DL3NQ	DK2ZF	G4KGC	DK1TB	
DL7ZL	HB9MKQ	OE1ERC/1	KA6HZO	

OSCAR 10 Mode L continues to perform as it has since its turn on. The CW Beacon continues to modulate the down link signals. VE7BBG and I have experimented with biasing the transponder by VE7BBG transmitting a strong carrier off frequency, and observing that the CW Beacon modulation on my signal and other signals in the pass band all but disappeared. The transponder receiver continues to be sensitive as indicated by the uplink powers for some of the stations I have worked. In summary, the secret to successful Mode L operation is in the downlink antenna and receiving system.

- The following is from JA1SYK via JR1SWB

Country	Stations	Uplink Equip.	Downlink Equip.
Japan	JA1AUH	25el loop yagi 2x2C39	4x21el yagi
	JA1SYK	2m Dish 2C39	4x21el yagi
	JA1UHY	2x21el yagi 10W	2x23el yagi
	JE1HHJ	?	?
	JG1SSK	8x25el loop yagi 2C39	2x21el yagi
	JR1WZI	40el loop yagi 10W	2x21el yagi
	JA3EUP	2x34el yagi 10W	2x21el yagi
	JA4CDC	?	?
	JA4GVA	2x25el loop yagi 10W	?
	JA4TTS	4x26el yagi 10W	2x21el yagi
	JR4BRS	3m Dish 2C39	4x21el yagi
	JA6DZO	?	?
W. Germany	DJ5BV	16x23 yagi 400W	?
	DJ3OS	5KW EIRP	?
	DJ8QL	5m Dish 3CX100 20W	same as uplink
	DL7YC	3m Dish 70W	?
	DJ9PC	3m Dish 200W	same as uplink
	DK2LR	4x10el + refl 60W	?
	DC6YU	?	?
	DJ5KQ	?	?
	DL3NQ	?	?
	DL7ZL	?	?
	DL9GU	?	?

**Did you work W5LFL?**  
**Check the list on page 4!**



	DJ7BG	?	?
	DK2ZF	?	?
	DK1TB	?	?
	DF0EME	30ft Dish klystron	same as uplink
Austria	OE1VKW	16ft helix 50W	2x19el cross yagi
	OE9XXI	7.6m Dish L.P 50W	same as uplink
	OE1HAB	4x23el yagi 7W	?
	OE9FKI	3m Dish 50W	4x16el yagi
	OE1ERC/1	?	?
Switzerland	HB9CAI	4x23el yagi 50W	?
	HB9MZQ	16ft. dish 2x2C39	same as uplink
England	G3WDG	5ft Dish 100W	?
	GW3XYW	6m Dish 75W	?
	G4KGC	?	?
Netherlands	PA0SSB	single yagi 2W	?
Italy	I5CTE	?	?
	I7UGO	?	?
Czecho- slovakia	OK1KIR	?	?
Canada	VE7BBC	6m Dish 2.5W	same as uplink
	VE7CLD	?	?
	VE4MA	?	?
U.S.A.	W1JR	?	?
	K6MYC	16ft Dish 20W	?
	W4HHK	?	?
	KA6HZO	?	?
	W8YIO	4.2ft Dish 10W	?
	K0RZ	2x38el loop yagi	2x4x15el yagi
	W0HHE	20ft Dish 100W	?
Alaska	KL7NO	1000W EIRP	?
Australia	VK5QR	2m Dish 90W	?
South Africa	ZS6AXT	16el quagi 100W	?

- Additional reports on Mode L operations are solicited.

### Ops Schedule Summary:

AO-10: Mode-B from Mean Anomaly 40 to 220 except when in Mode L.

Mode L on UTC Saturday and Wednesday from one hour prior to until one hour subsequent to apogee time.

Monday is QRP day; less than 100 watts ERP please.

UO-9 Sat: 1200 baud bulletin, telemetry, digitalker, 21 MHz beacon

Sun: 200 baud bulletin, telemetry, digitalker, 21 MHz beacon

Mon: Whole orbit, fast-scan radiation data

Tue: Check-summed telemetry data

Wed: CCD imager data

Thu: Whole orbit telemetry data scan

Fri: Load bulletin, digitalker, telemetry schedule

The 2.4 GHz beacon is being activated on alternate weekends. On these occasions the precision magnetometer and radiation detectors are powered down for power balance.

RS-5 Xpondr on Sat. & Sun. RS-7 Xpondr on Sat. & Sun.  
RS-6 Xpondr on Tue. RS-8 Xpondr on Thu.

## Recent UoSAT-OSCAR 9 Telemetry Block

Decode per ASR 43/44.

```

AMSAT 10101 10010 00000 10000 01110 00011 00011 11101 00000
AMSAT 10101 10010 00000 10000 01110 00011 00011 11101 00000
00110 01030 02760 03030 04001 05370 06307 07744 08447 09457
10100 11020 12000 13368 14312 15626 16538 17773 18382 19402
20150 21300 22716 23002 24010 25418 26432 27272 28458 29568
30270 31290 32668 33256 34011 35362 36397 37343 38474 39219
40090 41100 42741 43016 44045 45000 46003 47410 48497 49442
50110 51090 52274 53137 54700 55188 56464 57461 58426 59454

```

## UoSAT Bulletin-55 16th December 1983

### UoSAT-B Spacecraft Status

Construction of the UoSAT-B prototypes and flight components continues apace at the University of Surrey, in the USA, Canada, etc! All prototype PCBs have now been laid out and most outstanding boards have now been returned for population. Both CAD stations at Surrey are in 24-hour continuous operation to apply modifications in order to get as many flight boards produced before Christmas as possible. The effects of the Christmas holiday at many of our suppliers could delay the final construction of a number of boards.

Detailed specifications of the UoSAT-B spacecraft will not be posted until they have been finalized in flight versions; data on the primary systems will appear first sometime in January, followed by the experimental systems as our workload permits. The primary spacecraft systems will, however, be nearly compatible to those on UoSAT-1, so little work will need to be done on existing ground hardware for the new craft. The telemetry format, while similar, will have changed channel allocations and calibration equations, so software modifications will be necessary.

Fifty NiCad battery cells have been delivered to AMSAT-CANADA for evaluation, a flight pack and a flight spare pack of 10 cells each have been selected from the set following exhaustive tests and matching. The initial labeling and x-raying are already completed; this was followed by a battery of automated electrical tests to select a matched group of 10 flight cells and 10 flight spares. The flight spares will be cycled after launch to simulate the cells on the spacecraft and to allow experimental measurements to be made. The flight cells are currently being shipped to Surrey for mounting in a pack and integrating with the spacecraft framework.

Artwork for the CCD and radiation/particle detector memory boards is complete, and boards are working. The particle wave counter/correlator board has also been tested. Complete testing awaits the memory readout boards, which have been laid out.

The 1802 computer is progressing well. The CPU and main I/O board are running and the 4116 memory board is under test. The Digitalker speech synthesizer board



layout is also complete. Software production has now begun, using an in-circuit emulator with memory-map facilities to replace the 4116 board. Minor complications with some of the I/O ports when driven by the emulator have held up some of this development.

The CCD camera analogue and digital PCBs have been laid out. Both analogue and digital sections have been tested separately and the two sections are now being connected.

The command system prototype testing is complete, with the demodulator board populated and added. The receivers are now awaited for full uplink simulation and test.

Layout of all 4 telemetry system boards is complete. All four have been populated and are working well, with the minor exception of part of the frame header. The initial two boards contain a basic telemetry system, with the third adding frame headers and the fourth a programmable channel dwell facility.

### UoSAT-1 QSL Cards and UoSAT-B Stickers

At long last, the UoSAT-1 QSL cards have been received. We will attempt to send one to all individuals who have sent us a report over the past two years, however the clerical task at this time is somewhat daunting, so for a faster service, please send the UoSAT team a stamped, addressed envelope or an IRC.

A number of colored UoSAT-2 vinyl stickers have also been produced. These will be sent to all individuals who are involved directly with the project. Others may request a sticker with their QSL card, although a second IRC or similar donation would be appreciated to cover the printing costs.

### Short Bursts

- A new software publication for use with personal computers designed for orbital tracking of satellites is being offered by AMSAT. The author is GM4IHJ. Call or write AMSAT HQ for info.
- N5AHD reports his station at Corpus Christi University (Texas) now includes fully automatic UoSAT tracking including antenna pointing, polarization switching, Doppler shift frequency correction and other unique features. Bob plans to publish details of this superior station soon. QRX!
- VE5XU reports keen interest in the STS-9/W5LFL mission; says CBC came by his QTH for TV interview.
- ASR is interested in running an AO-10 DX scorecard by country. We believe there are more than 100 prefixes that have been on at least once. Send in your validated list so we can compile a master list. We'll run it periodically so everyone can keep track of the fantastic DX now appearing.
- High school students from Alabama will have a Get Away Special aboard a future Shuttle. One of the experiments will include an amateur radio transmitter. This will mark the first time a "GAS" will be allowed to radiate RF. It also breaks other new ground that will make easier AMSAT's future prospects for PACSAT and other future missions on the Shuttle. Hams at the Mar-

shall Space Flight Center (NASA) are helping the students.

- The membership recruitment drive ended 31 Dec. 83. It brought in hundreds of new members and rewarded well the top recruiters. Watch the next ASR for the list of prize winners.
- The AO-10 eclipse season ended last month so energy available is up a bit. AO-10 is off-pointed from geocenter by about 7 degrees now. This angle and the operating time may be adjusted after DJ4ZC returns from his EA8 holiday. Presently AO-10 is off from MA 220-040, or about 30% of each orbit.

### New Packet Sounds Heard on AO-10

W3IWI reports packet experiments on Special Service Channel L1 have now evolved to PSK (phase shift keyed) signals from the formerly employed FSK mode. WØPN exchanged 512 byte blocks with VE1SAT. The successful transmission of packets was increased from about 60% to about 90% (first transmission) using PSK. The theoretical advantage of using PSK over FSK (non-coherent) is several dB for a constant error rate. The WØPN-VE1SAT experiments suggest a confirmation. W3IWI monitored the QSO and suggests future HDLC packeteers may want to move to PSK earlier than planned despite the somewhat more complex equipment required with PSK compared to FSK. FSK has been used by amateurs for decades (RTTY) and has recently been used by computer buffs for audio cassette data storage. The so-called Kansas-city standard uses FSK. UoSAT-OSCAR 9 uses FSK at 1200 baud. For signal to noise margins of only a couple of decibels, however, PSK proves superior; yields a lower error rate for most types of noise environments.

### From KA9Q

```
Satellite: oscar-10
Catalog number: 14129
Epoch time:      84001.67617120
Sun Jan 1 16:13:41.192 1984 UTC
Element set:      MH 1-3-84
Inclination:      25.8370 deg
RA of node:       222.8130 deg
Eccentricity:     0.6084848
Arg of perigee:   233.3550 deg
Mean anomaly:     54.0540 deg
Mean motion:     2.05854161 rev/day
Decay rate:       0 rev/day
Epoch rev:       416
Semi major axis: 26105.730 km
Anom period:      699.524359 min
Apogee:           35615.140 km
Perigee:          3845.260 km
Translate freq:   581.0047 mhz
Invert:           1
Beacon:           145.8100 mhz
```



## Did You Work W5LFL?

This is the first draft of the W5LFL log, which we've put together after carefully transcribing about 4 hours' worth of tape. Background noise made it difficult for Dr. Garriott to write down or respond to each call received. The entire W5LFL log was recorded on tape, therefore, the tape becomes the official log. If your call isn't there, check the list of incomplete calls that follows the first list. If you attempted to contact W5LFL and are not on the first list, please do the following:

Look for a call sign resembling yours in the list of "incomplete" calls. If you find one, send us as much information about your transmission as you can, including date and time in UTC. We'll compare it to the time on the tape, and decide if your call qualifies as a contact. All determinations will be made by W5LFL and ARRL. Address your QSO information to ARRL Hq., Att: W9KDR, 225 Main St., Newington, CT 06111 — *Bernie Glassmeyer, W9KDR*, ARRL Headquarters.

AA6S	K1PAD	KA7GHR	N4HY	TI3DJT	W2PAU	WA1FCK	WA8TXT*
AB7C	K1PXE	KB4CRT	N4JBK	VE1AFU	W3CWG	WA1JXN	WB0SWD
AE7Q	K2IBP	KB4WM	N5BLZ	VE1BB	W4AQL	WA1PSI	WB0TTW
AJ6L	K2OVS	KB6AMN	N5DDT	VE1CAW	W4BE	WA2BSH	WB2ONA
AL7W	K2RIW	KB6TN	N5EZM	VE1CGY	W4KYL	WA2CHY	WB4EMI
CE3CKE	K2TTI	KB6V	N6AVR	VE1OC	W4MOP	WA2SEF	WB4YJC
CE3AHD	K3DI	KC4P	N6DD	VE1UT	W4ODW	WA2VMS	WB4YUD
DC6SN	K3NV	KC7EM	N6ECL	VE3BNA	W4ROA	WA2WVL	WB5AZI
DC6AH	K3PGP	KC8KE	N6JM	VE3BNO	W4WJ	WA4BEV	WB5DSH
DC8AM	K3TC	KD5JH	N6NB	VE3KLW	W5FF	WA4BZJ	WB5PDW
DF6UQ	K4GFG	KD6LQ	N6QP	VE3KRP	W5GEL	WA4EWA	WB5RRR
DG6NAA	K4JT	KD7IY	N6RJ	VE4OO	W5HTK	WA4GIJ	WB5VZL
DJ1IJ	K5ADQ	KD7RF	N7ARE*	VE7BOQ	W5HUQ	WA4KXY	WB6DEO
DK6RX	K5CAY	KE5C	N7BHC*	VE7CYB	W5LFG	WA4LZR	WB6DTR
DL0DAA	K5IH	KE6VK	N7DOF	VK1BX	W5LUU	WA4MMD	WB6GYE
DL1YCA	K5OKG	KE6XJ	N7WS	VK1DF	W5PNY	WA4PLR	WB6IDK
DL9GAK	K5OXE	KF0M	N8DEJ	VK1ORR	W5RRR	WA4SBC*	WB6NOA
DL9MH	K5QHF	KF4SX	N9GA	VK1RR	W5UN	WA4TNV/KL7	WB8NWX
EA3AWD	K6DYD	KF6Z	NG5P	VK1ZAH	W6KH	WA5AFO	WB8PAT
EI0RTS	K6GSS	KI7L*	NM5I	VK1ZIF	W6LEV	WA5DBY	WB9MSV
EI3FI	K6LY	KN0L	NN6E	VK1ZQR	W6YBL	WA5DXR	WD0FOY
F1FVX	K6MYC	KN2D	NR4P	VK2KPG	W6YX	WA5NOM	WD4FAB
F5AD	K6TDR	KQ5D	NT6G	VK2PMN	W7AVD	WA6CFM	WD4IYS
F6AVG	K7GIJ	KQ5W	OE6WIG	VO1BK	W7BGH	WA6IUM	WD4KSN
G4UYL	K7ND	KS1S	OE7FRH	VO1DI	W7ID	WA6KNR	WD4RJI
G6DEF	K7SMV	KT1U	OF2XN	VO1FP	W7KMF	WA6PEV	WD4VCS
G6EGY	K7UGA	KX0O	OH3XA	VO1FR	W7RV	WA6RLV	WD5BPB
GM8NXC	K8CS*	KX6C	OK1DFG	VO1GG	W7SW	WA6SGK	WD5IFB
GW6OJK	K8KNT	KY4Z	OK1DIG	W0PHD*	W7YKN	WA6YBT	WD5KBZ
HH2CX	K9BI	KY7B	OK1KRA	W0PN	W8AC	WA7BJU	WD6AUS
I1NRF	K9HMB	N0COX	OK2BDS	W1AW	W8FQK	WA7DPM	XE1ALQ
I5FBP	KA0PGN	N0CXC	OK3CGX	W1PSG	W8GUS	WA7JUO	XE1FV
JY1	KA0Y	N0IS	OZ1DPR	W2EFL	W8WN	WA7RQS	XE1TU
K0LIR	KA2BTD	N0LL*	OZ1ELF	W2GDV	W9KDR	WA7UIB	XE2RCP
K0RI	KA4WJA	N2EK	SM2KT	W2JNO*	WA0VJF	WA8KEM	YU7KN
K0RZ	KA5FPV	N4GAN	SM4CLU	W2NQ	WA1BAR	WA8MTI	YU7MAU
K1IKN	KA6DQZ						

\*Heard on CW

### Incomplete Calls

Orbit 40	Orbit 71	Orbit 111	Orbit 130	Orbit 135	Orbit 145	Orbit 149	Orbit 150
W5V__	W5U__Z	OE7U__	WA6G__	WB5L__J	__ZPR	VE3__	WA7__
KA__	WA7__V	DL9__	K5__V	__6E	WB2JS__	WB9C__	AD1__
__AJW	WB5__B__	HG8__N	WA6__	K5D__	__YW		
	__5RN	DH0AA__	WA2VW__	__1IX			
Orbit 56	WD5CG__				Orbit 146		
WA7RV__	WA4DN__	Orbit 113	Orbit 134	Orbit 144	W7__		
W7Q__	Orbit 97	WA4N__	KA7__	__XC	VE3J__		
	K5A__	K2U__	KR8__	WD4__			
			N8C__	KA1__			
			W4__	__QG			
				__A__A			
				__1DCR			

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